

# Impact Assessment Crane Division of Naval Surface Warfare Center, Naval Sea Systems Command

A Report to the Southern Indiana Business Alliance

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***SPEA***

Institute for Development Strategies  
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**SDG**

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# Introduction

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Over the past decade, through retirement, early retirement and other separations, about 1,460 employees or 31 percent of the workforce at NSWC Crane have stopped working at the naval base. This reduction, although in the same order of magnitude as the closing of nearby industrial facilities of comparable size, has not attracted nearly the regional nor statewide attention—even though these plant closings were associated with jobs involving lower average annual wages.

At the national level, the pressures to reduce employment at the Crane Naval Surface Warfare Center (NSWC Crane or Crane) and at military facilities all across the country continue.

The National Defense budget is flat at about \$290 billion, some \$80 billion under the National Security Strategy and Quadrennial Defense Review (QDR) 5-Year Defense Program requirements. This budget top-line is unlikely to change within the Balanced Budget Act and national budget priorities environment without a significant crisis.

The Naval force has been reduced from some 550 combatant ships to slightly over 300 (the number required by the QDR), a 45 percent reduction. Within the Navy budget, the current and projected shipbuilding program will result in a 200-ship force. With this reduction in fleet, coupled with increased use of Naval forces for power projection and peacekeeping operations, the Navy's operational tempo is higher than that estimated in the QDR for two major regional conflicts such as the Gulf War.

Therefore, the shore infrastructure is under intense pressure to contract and free up money for force modernization and acquisition. Shore infrastructure reduction initiatives include:

- A study, for contracting out, some 200,000 positions over the next 5 years;
- Privatization of many functions including technical and engineering functions similar to those performed at Crane;
- Consolidation of similar functions, particularly research and testing, performed in defense department shore activities; and
- Two additional rounds of Base Realignment and Closure (BRAC), an initiative proposed by the QDR and by Secretary William Cohen that may pass into law with the next Administration.

While it is unlikely that NSWC Crane will close in the near term, without aggressive action by all stakeholders it is probable that the attrition will continue, resulting in hundreds of additional jobs lost. This impact report provides a basis for discussion with all of the major stakeholders about Crane's importance to the state and region.



# Executive Summary

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Considering Crane's tenants, large contractors, and small contractors, as well as the operations of the navy itself, few organizations surpass Crane in their impact on South Central Indiana and the state overall. Crane is directly and indirectly responsible for almost 6,800 jobs in Indiana, and the over \$241 million in wages associated with those jobs. It also adds over \$22.2 million in tax revenues to state and local coffers.

At one time Crane's impact on the region and state was even greater. In 1991, the base employed approximately 4,700 workers, compared to the 3,240 people working at Crane as of July 2000. That's an estimated net loss of 1,460 jobs for Hoosiers over the course of nine years. Losses are likely to continue unless all stakeholders understand Crane's value and work to protect the interests of the region and state.

Conversely, an expansion at NSWC Crane would be a boon for Hoosiers. The next round of Base Realignment and Closure could lead to an increase in workload at Crane (as work from other military facilities is redistributed). New projects may also be assigned to the base. A sample projection shows that an addition of 200 jobs at the base would lead to 124 related jobs off the base. This translates to over \$2.6 million in wages to employees. It would also bring in over \$540,000 in tax revenues for the state and region.

Not only has Crane boosted the economies of surrounding communities, it has taken a leading role in assisting its neighbors with environmental protection, education, economic development, public safety and recreational opportunities. Projects typically involve local officials, Crane employees, and other community organizations.

In the primarily rural counties most heavily impacted by NSWC Crane, the base has a significant positive impact on education. It employs residents in a range of skilled

jobs, counteracting the state's "brain drain" problem by attracting and retaining educated workers. Over 670 Crane employees attended Indiana institutions of higher education: 21 with associate degrees, 651 with baccalaureate degrees, and one with a doctoral degree. Workforce training dollars for Crane employees exceed \$4.7 million annually. Crane contributes about \$600,000 to Indiana colleges and universities. The base attracts federal aid to local schools, and its employees participate in a range of programs that enrich the education of the region's young people.

Community outreach is evident in the volunteerism and charity of Crane employees and their organizations, as well as public use of Crane facilities, community safety and infrastructure partnerships, and active participation in local and regional economic development efforts. Crane has also been a leader in environmental stewardship. The base makes significant contributions in the areas of natural resources management and research, hunting and fishing, outdoor recreation, green practices, and wildlife preservation and research. Technology transfer is another means by which communities have benefited from the presence of Crane.

Despite the high level of economic and other benefits emanating from Crane, they could be considerably higher if Crane were used as an engine of technological leverage to spur a high-technology cluster in the region. The resources available at Crane, not the least of which is its cluster of scientists and engineers, make this a promising venture. Mechanisms to maximize technology transfer from Crane might include expanding partnerships with higher education institutions, creating a technology park, augmenting the technology transfer program with state funding, and providing state and federal funding support to channel retiring employees into starting high-tech entrepreneurial firms. Building on Crane's assets, a high-technology corridor could be developed that would benefit all of Indiana.

# Economic Impact

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The following economic impact analysis considers three perspectives as related to economic activity at NSWC Crane. These perspectives are:

- **Current Scenario:**  
Current direct, indirect and induced economic impact of employment, related wages, tenants and contracting;
- **Lost Scenario:**  
Direct, indirect and induced economic impact of the lost employment and related net wages caused by drawdown over the past five years and as offset by pension payments; and
- **Potential Scenario:**  
Potential direct, indirect and induced economic impact of adding a new program to Crane.

Analysis focused on the eight counties with the greatest number of employees currently working at Crane. These counties and their employment and wage levels as of June 1999 were:

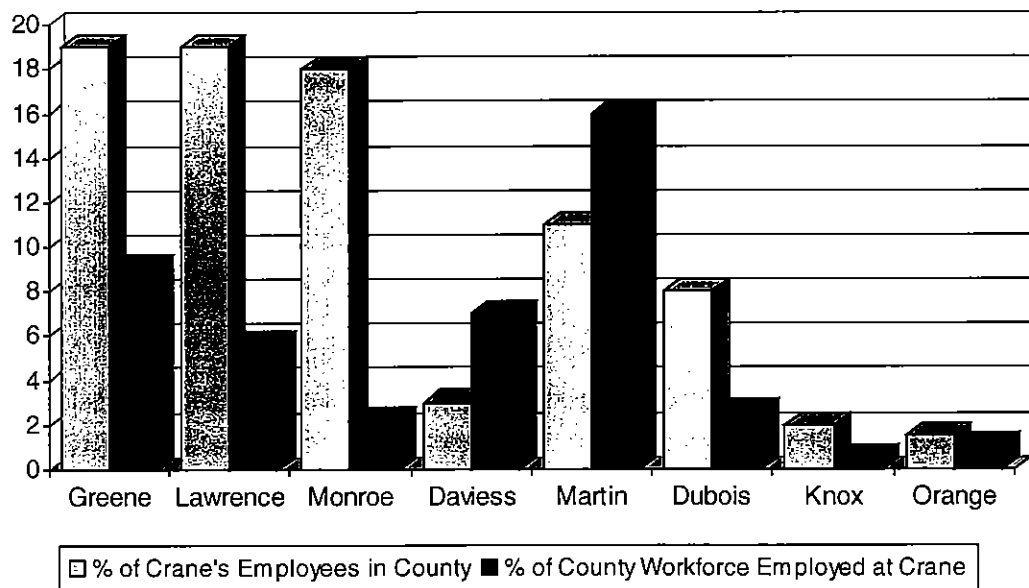
NSWC Crane Employment, Total Wages and Average Annual Wages			
County/Location	Number of Employees	Wages	Average Annual Wage
Daviess	440	\$20,350,000	\$46,250
Dubois	54	\$2,720,000	\$50,370
Greene	663	\$31,370,000	\$47,315
Knox	53	\$2,300,000	\$43,396
Lawrence	620	\$30,420,000	\$49,065
Martin	420	\$19,120,000	\$45,524
Monroe	572	\$31,520,000	\$55,105
Orange	47	\$2,230,000	\$47,447

NSWC Crane Employment, Total Wages and Average Annual Wages			
County/Location	Number of Employees	Wages	Average Annual Wage
Other Indiana Counties	262	\$11,240,000	\$42,901
Outside Indiana	180	\$8,700,000	\$48,333
Total	3,280	\$158,590,000	\$48,351

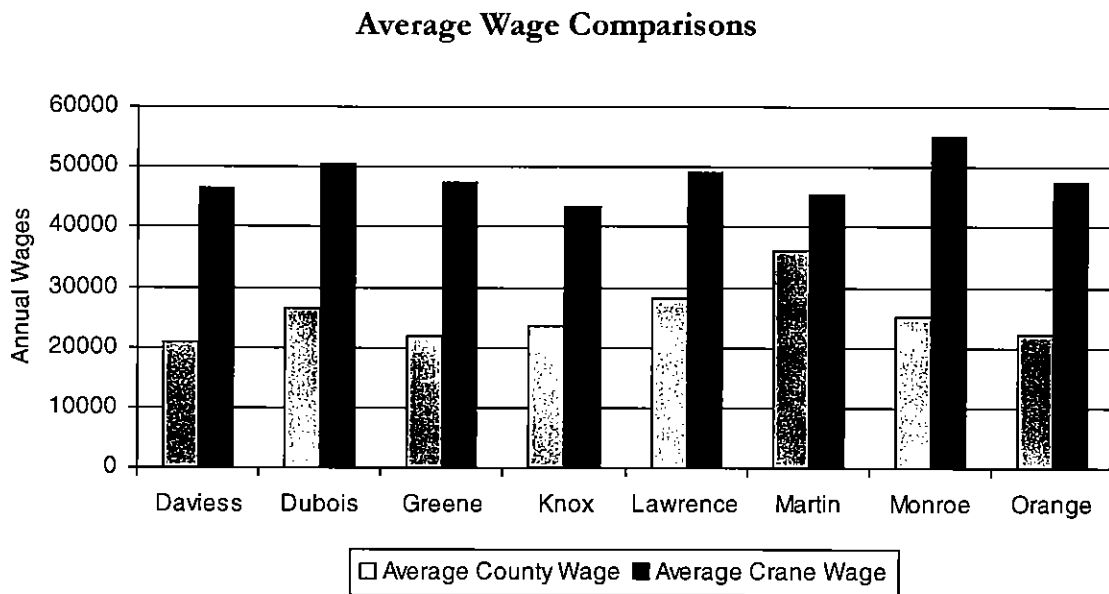
The next highest employment level within the remaining Indiana counties is 31 employees. Appendix I includes a county-by-county statewide breakdown on NSWC Crane employees, wages and average annual wage.

The counties in the 8-county region supply over 85% of Crane's workforce. Further, as the following chart shows, a significant percentage of each county's workforce—as much as 16%—is employed at NSWC Crane.

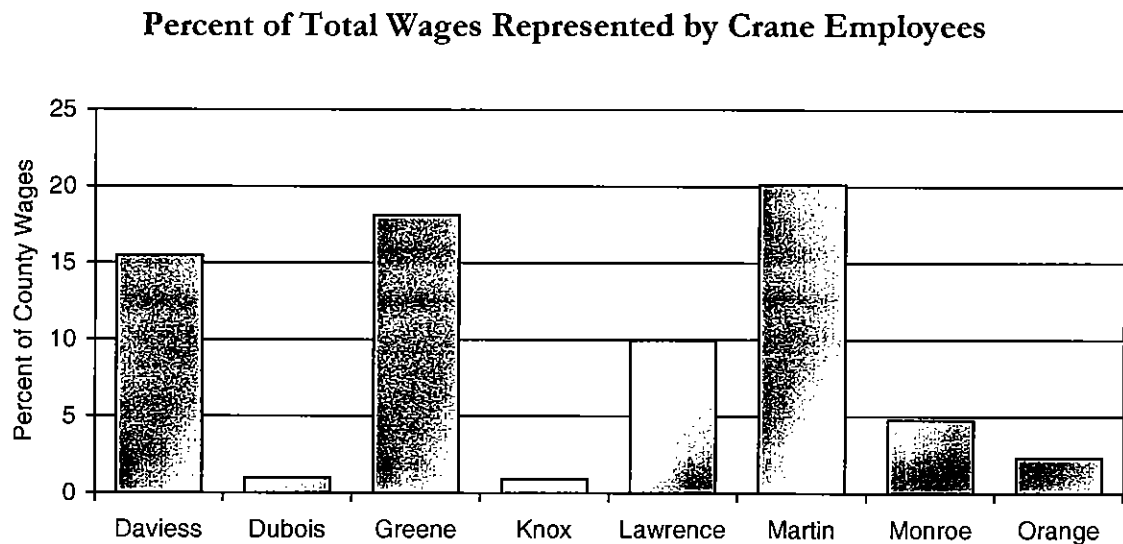
**Distribution of Crane Employees**



Employee wages are another way in which Crane significantly impacts the region. Consider how average wages of Crane employees from each county compare with the overall average wage in each county:



Crane is responsible for as much as 20% of the wages in these counties:



In addition to NSWCrane employees, the economic effects of several other groups were taken into consideration. These included large contractors, local firms who

were recipients of simplified procedures awards (small contractors), and tenant groups at NSWC Crane.

Several kinds of large contractors were included in the study, as detailed below.

Totals listed reflect performance in Fiscal Year 1999. Appendix II includes a detailed list of companies included in each category.

#### **Large Contracts, 1999**

<b>Category</b>	<b>Contract Total s</b>
Engineering services	\$52,960,741
Construction	\$1,849,974
Utilities	\$5,123,341
Total	\$59,934,056

Smaller contracts within the surrounding and statewide economies were awarded through simplified procedures awards and were substantially more numerous than the larger contracts detailed above. A summary is provided here:

#### **Summary of Simplified Procedures Awards by SIC, 1995-1999**

<b>SIC</b>	<b>Description</b>	<b>Total Amount</b>
1521	General Contractors,	\$8,292,047
1542	General Contractors, Non-residential, Non Industrial	\$430,153
1611	Highway and street construction except elevated highways	\$640,191
1711	Plumbing, heating and air conditioning	\$3,217,333
1721	Painting and paperhanging	\$310,203
1731	Electrical work	\$1,175,968
1752	Floor laying and other floor work, nec	\$69,673
1761	Roofing, siding, and sheet metal work	\$78,580
1771	Concrete work	\$159,867
1791	Structural steel erection	\$97,846
1794	Excavation work	\$990,878
1795	Wrecking and demolition work	\$393,958
1799	Special trade contractors	\$14,250
2421	Sawmills and planing mills	\$1,240,881
3599	Industrial and commercial machinery, equipment, nec	\$209,732
4212	Local trucking without storage	\$6,825
4911	Electric services (utility)	\$287,895

SIC	Description	Total Amount
4925	Mixed, manufactured, or LP gas	\$11,000
5031	Lumber, plywood, millwork, and wood panels	\$2,109,455
5211	Lumber and other building materials dealers	\$33,884,133
5713	Floor covering stores	\$12,561
7342	Disinfecting and pest control services	\$88,410
7359	Equipment rental and leasing, nec	\$335,849
7389	Business services, nec	\$21,205
7538	General automotive repair shops	\$22,203
8741	Management services	\$977,000
	Unclassified and undetermined	\$3,652,898
	Total	\$58,730,994.00

Appendix III includes all simplified procedures awards from 1995-99. These awards are included in the current scenario analysis as well. Figures presented in tables reflect average annual impact based on small contracts within the five year period.

Tenants at NSWC Crane also have a significant economic impact. Those included in the analysis are listed below. (Only one tenant, Great Lakes Industrial Hygiene, is not included. It was undergoing a contracting out study, and thus was unable to release information.)

Employment, Total Wages and Average Annual Wages of NSWC Crane Tenants			
Tenant	Number of Employees	Wages	Average Annual Wage
Army	619	\$30,200,000	\$48,788
Coast Guard	6	\$201,553	\$33,592
Defense Automated Printing Service	4	\$190,616	\$47,654
Defense Commissary Agency Detachment	13	\$353,600	\$27,200
Defense Reutilization & Marketing Office	17	\$680,391	\$40,023
Explosives Ordnance Detachment	4	\$161,776	\$40,444
Navy Resale Activity Detachment	4	\$75,000	\$18,750
Officer in Charge of Construction Office	16	\$759,600	\$47,475
Total	667	\$31,862,936	\$47,771

Finally, the impact of timber harvesting was also analyzed. Sales of timber harvested at NSWC Crane impact the economies of Martin, Greene, and Lawrence counties. Timber impacts are not detailed separately, but are included in summative tables.

In evaluating economic impact, three levels of geography were used: county, region, and state. Counties included in the regional analysis were Daviess, Dubois, Greene, Knox, Lawrence, Martin, Monroe and Orange. (These are the counties with the largest number of residents employed at Crane.)

Within each scenario and level of analysis, direct, indirect, induced and total effects were determined. *Direct effects* are the set of expenditures applied to the predictive model for impact analysis. *Indirect effects* are the inter-industry effects of input-output analysis—the impacts above and beyond the direct effects. *Induced effects* are the impacts of household expenditures. *Total effects* are the summation of direct, indirect and induced effects.

Although this analysis considers statewide economic impact, over 90 percent of NSWC Crane's employment is within the eight counties mentioned above. The estimated annual economic impact of NSWC Crane on the surrounding counties is over \$223 million in employee compensation effects, which encompass employee wages that result from the 6,248 jobs for which NSWC Crane is either directly or indirectly responsible. The attached appendices include more detailed information about each scenario.

Total Impacts	Region	State
Employment	6,248	6,779
Employee Compensation	\$223,893,246	\$241,614,688
State and Local Tax Revenues	\$9,252,518	\$22,289,829



## **Current Impact**

**In evaluating the current scenario, four primary sources of impact were considered:**

- Current employment and wage levels at the base;
- Current employment and wages among tenant groups at Crane;
- Contracts involving large multi-year awards; and
- The recent pattern of small contracts.

The number of existing employees at NSWC Crane is significant in its magnitude as well as in the average wage level associated with these jobs; average wage levels for NSWC Crane employees are much higher in every instance than the average wage levels in the 8-county region. The tenant groups at NSWC Crane are similarly a boon to the local economy. In addition, through large and small contracts, the facility is intrinsically linked to businesses all over the state. These impacts too, however, are primarily concentrated in the area near the base. Below, the total impact of these groups on jobs, wages, and tax revenues is provided, along with illustrations. Summary impacts for each separate group may be found in Appendix IV.

## **Employment Impact**

Through employment at NSWC Crane, its tenant groups, large contractor companies and organizations receiving small contracts (simplified procedures awards), a total of 6,779 jobs are tied to the base. An estimated 4,566 of these are a direct result of Crane. The number of related indirect and induced jobs is 2,213. The county, region, “other” and statewide breakdowns are below.

All Crane Groups <sup>2</sup> : Impact on Employment			
County or Location	Direct	Indirect/Induced Employment	Total
Daviess County	623	316	939
Dubois County	156	60	216
Greene County	947	432	1379
Knox County	74	36	110
Lawrence County	902	440	1342
Martin County	604	221	825
Monroe County	857	499	1357
Orange County	67	28	95
8 County Region	4231	2017	6248
Other Indiana	335	196	532
Total	4566	2213	6779

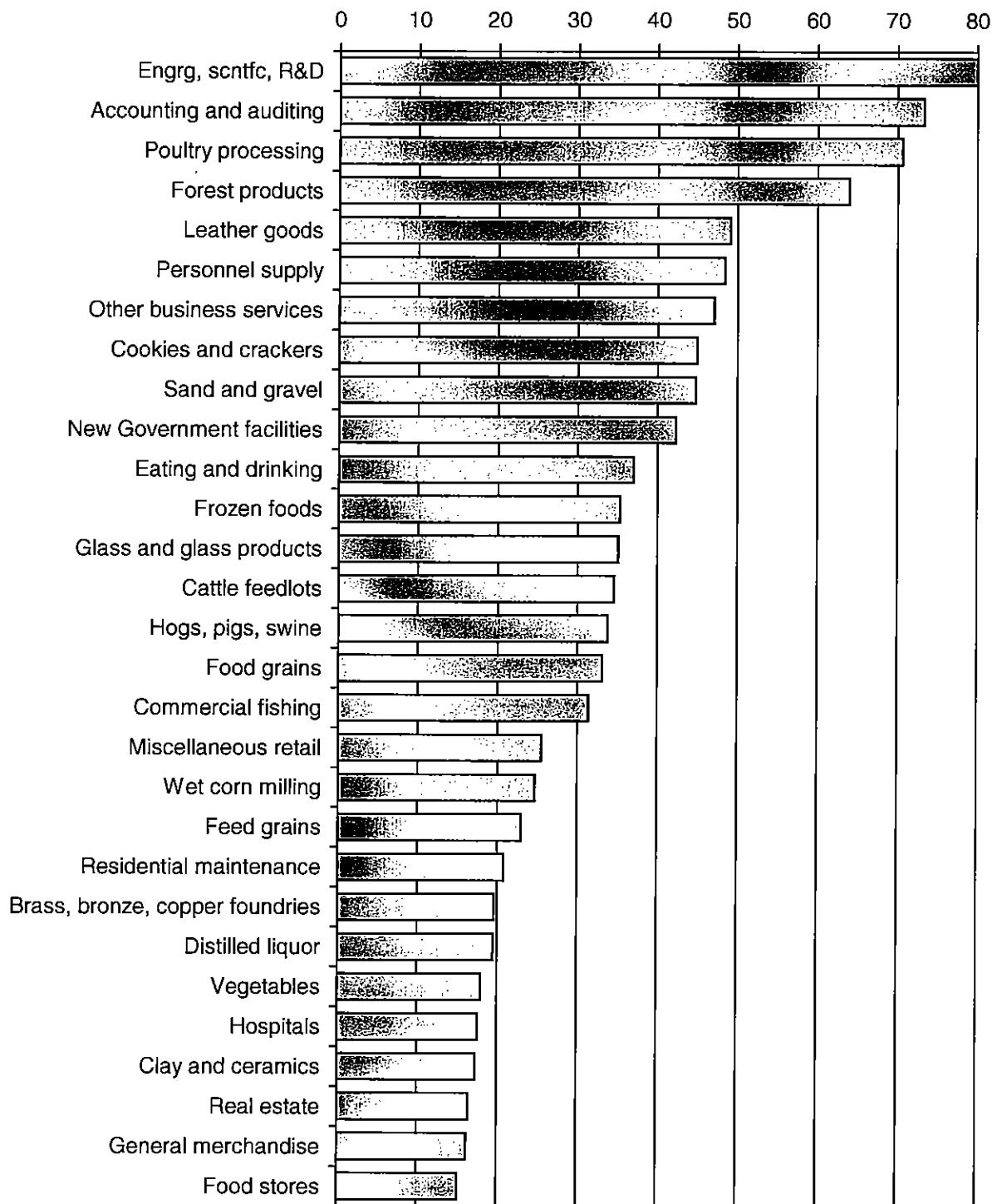
Direct employment refers to jobs at Crane, as well as those jobs in other groups included in the analysis which directly result from their relationships with Crane. Indirect employment includes jobs that are intrinsically related to activity at the military base, such as suppliers to the facility. Induced employment involves jobs that exist through the household spending of direct employment. Employees at retail stores in the region are a good example.

The chart on the following page shows Crane's impact on the 25 most positively impacted job sectors. For example, over 60 jobs in forest products exist as a direct or indirect result of Crane's presence. Jobs in engineering and science top the list; jobs in agricultural and service sectors are also generated.

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<sup>2</sup> Includes NSWC Crane employment, tenants, large contractors, small contractors, and timber sales.

# **Job Impact of NSWC Crane - 25 Most Positively Impacted Job Sectors**



County-level job impacts are listed below for a sampling of business sectors off the base:

**Regional Job Impacts**  
**"Off Base" Business Sectors by County**

<b>Business Sector</b>	<b>Daviess</b>	<b>Dubois</b>	<b>Greene</b>	<b>Knox</b>	<b>Lawrence</b>	<b>Martin</b>	<b>Monroe</b>	<b>Orange</b>	<b>Total</b>
Retail Trade	87.6	12.6	135.4	10.7	135.4	56.8	144.7	6.6	589.8
Health services	16.6	4.1	13	1.9	26.8	6.9	34.8	.8	105.0
Social services	7.9	.7	6.3	.8	10.1	1.8	14.1	.6	42.5
Personal services	8.3	1.1	4.9	.6	10	3.6	11.4	.4	40.3
Non-profit organizations	6.7	.7	8	.5	6.6	4.7	8.9	.4	36.6
Domestic Services	8.1	.4	11.1	.4	4.5	1.4	4.9	.7	31.4
Wholesale Trade	7.4	1.0	6.1	.9	5.2	2.4	6.8	.2	29.9
Banking	4.5	.5	7.8	.4	6.4	3.2	4.5	.4	27.7
Business services	1.9	.5	1.7	.7	4.9	1.7	9.9	.2	21.5
Automotive services	3.2	.4	4.6	.3	3.6	2.6	5.4	.3	20.4
Construction	4.3	.5	3.7	.3	3.6	1	5.3	.2	18.9
Real estate	3.1	.3	2.5	.2	3.8	.5	6	.3	16.7
Recreation services	1.9	.6	3.4	.3	3.3	1.3	5.2	.5	16.6
Professional services	2.0	.3	3	.2	2.5	.6	3.7	.1	12.3
Motor frt transport whsg	2.7	.3	2.5	.3	2.1	1.7	1.9	.2	11.7
Hotels and lodging places	1.3	.4	1.4	.4	1.3	.2	5.5	.3	10.8
Education services	2.5	.4	.4	.3	2.2	.8	3.2	.2	10.0
Federal non-military	1.1	.1	1.4	.1	1.4	2.7	1.5	.1	8.4
Communications	1.4	.2	1.4	.2	1	.8	2.6	.1	7.6
Motion Pictures	.8	.2	2.1	.1	.7	.4	2.3	.1	6.7

## Employee Compensation Impact

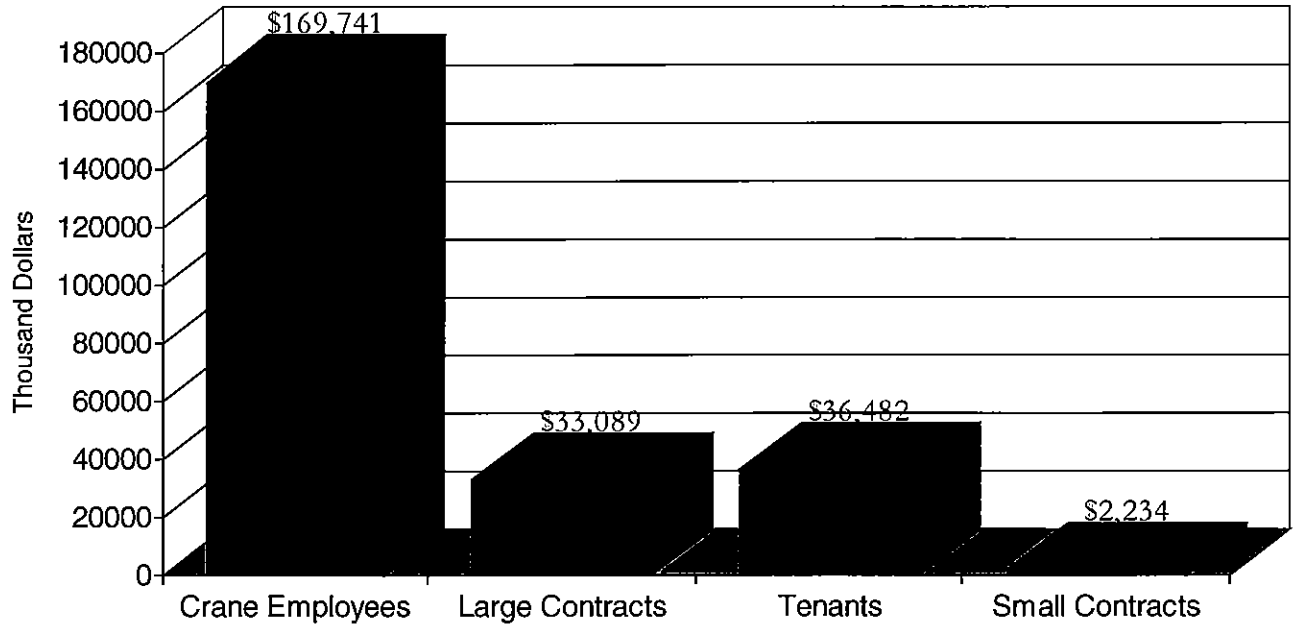
Employee compensation impacts are wages paid to employees.

For 1999, employee compensation impacts were estimated at \$241,614,688 with \$202,304,849 related to direct jobs and \$39,309,839 associated with indirect and induced jobs. The county, region, "other" and statewide breakdowns are below.

All Crane Groups: Impact on Employee Compensation (Wages)			
County or Location	Direct	Indirect/Induced Employee Compensation	Total
Daviess County	\$27,140,582	\$5,222,797	\$32,363,379
Dubois County	\$5,251,254	\$1,090,660	\$6,341,914
Greene County	\$41,860,828	\$7,058,040	\$48,918,868
Knox County	\$3,072,513	\$642,683	\$3,715,196
Lawrence County	\$40,711,136	\$7,675,820	\$48,386,956
Martin County	\$25,530,905	\$3,725,315	\$29,256,220
Monroe County	\$42,081,567	\$9,390,059	\$51,471,626
Orange County	\$2,972,053	\$459,748	\$3,431,800
8 County Region	\$188,626,146	\$35,267,099	\$223,893,246
Other Indiana	\$13,678,703	\$4,042,740	\$17,721,443
Total	\$202,304,849	\$39,309,839	\$241,614,688

Considering Crane itself, its large and small contractors, and its tenants, the base draws a lot of money into local economies through employee wages. The following chart shows this (figures are in thousands of dollars):

## Related Local Wages Entering the Regional Economy (1999)



## Tax Revenues Impact

Tax effects involve federal, state and local impacts in various tax revenue categories.<sup>3</sup>

Total local/statewide tax revenues derived from NSWC Crane are an estimated \$22,289,829 annually. The county, region, “other” and statewide breakdowns for annual local/statewide tax revenues are below.

All NSWC Crane Groups: Impact on Tax Revenues	
County or Location	Local/Statewide Tax Revenues
Daviess County	\$3,031,838
Dubois County	\$512,680
Greene County	\$3,916,333
Knox County	\$388,429
Lawrence County	\$4,112,303
Martin County	\$1,310,115

<sup>3</sup> Categories include corporate profits tax, dividends, indirect business taxes (motor vehicle license, other taxes, property tax, S/L nontaxes, sales tax, and severance tax), interest (gross), personal taxes (estate and gift tax, income tax, motor vehicle license, nontaxes [fines – fees], other [fish/hunt], and property taxes), and social security taxes (employee and employer contributions). See Appendix VII for breakdowns.

All NSWC Crane Groups: Impact on Tax Revenues	
County or Location	Local/Statewide Tax Revenues
Monroe County	\$6,172,751
Orange County	\$206,408
8 County Region	\$19,648,410
Other Indiana	\$2,641,419
State Total	\$22,289,829

Clearly, Crane makes a real difference in the ability of state and local governments to maintain infrastructure and provide essential services to residents.

## Localized Illustration of Impact

NSWC Crane could be considered a basic employer for the region: it brings in millions of (federal) dollars from outside the state and region, while it helps to keep this money in the region's economy through its links with state and local businesses. (See Appendix V for a discussion of basic employers.) It also provides good jobs for Hoosiers.

To illustrate the local impact of Crane, below are the estimated number of jobs created in health services in 1999, either indirectly or through induced effects of NSWC Crane employment and related wages:

- 16.6 health services jobs in Daviess County at an average annual wage of \$18,870
- 4.1 health services jobs in Dubois County at an average annual wage of \$28,036
- 13 health services jobs in Greene County at an average annual wage of \$18,550
- 1.9 health services jobs in Knox County at an average annual wage of \$34,903
- 26.8 health services jobs in Lawrence County at an average annual wage of \$31,161

- 6.9 health services jobs in Martin County at an average annual wage of \$16,221
- 34.8 health services jobs in Monroe County at an average annual wage of \$37,034
- 0.8 health services jobs in Orange County at an average annual wage of \$18,329

Again, to illustrate local impact, Crane large contracts in 1999 create the following total jobs directly, indirectly or through induced effects:

- 176 total jobs in Daviess County at an average annual wage of \$25,288
- 24 total jobs in Dubois County at an average annual wage of \$24,784
- 272 total jobs in Greene County at an average annual wage of \$25,226
- 20 total jobs in Knox County at an average annual wage of \$25,192
- 264 total jobs in Lawrence County at an average annual wage of \$25,208
- 166 total jobs in Martin County at an average annual wage of \$25,188
- 273 total jobs in Monroe County at an average annual wage of \$25,248
- 19 total jobs in Orange County at an average annual wage of \$25,597

To further illustrate, from 1995-1999 NSWC Crane small contracts created either directly, indirectly or through induced effects:

- 10.2 health services jobs in Dubois County at an average annual wage of \$27,011
- 3.1 wholesale trade jobs in Greene County at an average annual wage of \$21,429
- 19.9 agricultural services jobs in Lawrence County at an average annual wage of \$13,164
- 4.6 construction jobs in Monroe County at an average annual wage of \$36,372

It should be noted that while the above analysis incorporates most of the largest



sources of impact on the regional economy—NSWC Crane itself, its tenants, most of its large contractors, its small contractors, and the timber on its acreage—this study is certainly not exhaustive. For example:

- It is estimated that reservists spend over \$2.5 million annually in the region.
- The study included large contractors in the areas of engineering, construction and utilities, but there are companies in other categories that do major business with Crane.
- Another source of impact is the over 50,000 area residents and travelers that visit Crane annually for business and recreational pursuits. Many business visitors spend money in the area for lodging, food, and entertainment. Approximately 2,154 business visitors spend an estimated \$457,725 in the region annually.
- Crane retirees receive pension payments from the federal government. Of the approximately 2,580 retirees of Crane, over 92% stay in Indiana. Their pension funds, estimated at \$53,685,000, boost the state's economy.

While it has not been possible to capture all of these impacts, the major impacts that have been measured and analyzed speak for themselves: Crane generates over \$22,289,829 in state and local tax revenues annually, contributes over \$241,614,688 in wages to workers in Indiana, and is responsible for providing over 6,779 jobs to Hoosiers.

## Impact of Recent Downsizing

Since 1994, employment levels at NSWC Crane have declined steadily.

Only in 1998 were more employees hired (170) than were lost (139)

through retirement, early retirement and resignation (excluding removal

and death). Since 1994, a total of 998 employees left their jobs while at

the same time 461 were hired.

Near the peak of employment at Crane, in 1991, the navy employed 4,700 Hoosiers at the base. As of July 2000, that number is down to 3,240, reflecting a net loss of 1,460 jobs in nine years. The following analysis, focusing on the past five years, shows net losses totaling 439 jobs and \$7,529,150 in wages, as well as \$1,668,351 in state and local tax revenues.

In evaluating net job loss, employees who were removed from their jobs or who passed away were not included in the net calculation. As a result, adjusted lost employees exceeded new hires by 537 jobs. The table below shows the annual and total net lost employment levels for the period from 1995 to 1999.

NSWC Crane Net Change in Employment - 1995-99						
Category	FY 95	FY 96	FY 97	FY 98	FY 99	Total
Total Lost Employees	259	185	193	139	222	998
Less Removal	1	2	4	6	-	13
Less Death	7	3	8	5	-	23
Adjusted Lost Employees	251	180	181	128	222	962
New Hires	15	37	60	170	179	461
Net Lost Employment	244	148	133	(31)	43	537

Wage inflows (through new hires and pensions) and wage outflows (through lost employees) were determined for the five-year period. Statistics from human resources at NSWC Crane made possible evaluation of the number of lost employees who are receiving a pension (17-34 percent of lost employees) as well as valuing that

pension (50 percent of employee annual salary). The resulting net wages and related calculations for each year are shown below.

NSWC Crane Net Change in Wages - 1995-99					
Category	FY 95	FY 96	FY 97	FY 98	FY 99
Percent of Lost Employees with Pension	21%	26%	27%	17%	34%
Lost Employees with Pension	54	48	52	24	75
Average Annual Salary	\$45,611	\$47,022	\$42,597	\$49,468	\$49,625
Amount of Pension Payment	\$22,806	\$23,511	\$21,299	\$24,734	\$24,813
Wages from Net Lost Employment	\$11,129,084	\$6,959,256	\$5,665,401	(\$1,533,508)	\$2,133,875
Less Pension Payments	\$1,240,391	\$1,130,879	\$1,109,865	\$584,464	\$1,872,848
<b>Net Wages</b>	<b>\$9,888,693</b>	<b>\$5,828,377</b>	<b>\$4,555,536</b>	<b>(\$2,117,972)</b>	<b>\$261,028</b>

## Employment Impact

Between 1995-99, the reduction in employment totaled 537. Combined with the associated loss in wages, there has been a significant negative economic impact on the regional and statewide economy. Since 1995, 316 jobs have been lost statewide, 93 percent of which were lost within the 8 county region focused on in this study. An additional 123 indirect or induced jobs were lost statewide for a total of 439 lost jobs, as detailed below. The negative numbers in 1998 actually indicate an employment gain.

NSWC Crane Net Loss in Employment: Impact on Employment			
Year or Location	Direct	Indirect/Induced Employment	Total
1995	201	78	279
1996	60	23	83
1997	93	36	129
1998	(43)	(17)	(60)
1999	5	2	7

NSWC Crane Net Loss in Employment: Impact on Employment			
Year or Location	Direct	Indirect/Induced Employment	Total
8 County Region	294	114	408
Indiana	316	123	439

## Employee Compensation Impact

Employee compensation impacts are wages paid to employees.

The total statewide loss in employee compensation from 1995 to 1999 was more than \$7.5 million. The direct, indirect/induced and total breakdowns by year, region and state are as follows:

NSWC Crane Net Loss in Employment: Impact on Employee Compensation (Wages)			
Year or Location	Direct	Indirect/Induced Employee Compensation	Total
1995	\$3,416,479	\$1,369,310	\$4,785,789
1996	\$1,028,659	\$408,676	\$1,437,335
1997	\$1,573,908	\$630,815	\$2,204,724
1998	\$(731,746)	\$(293,280)	\$(1,025,026)
1999	\$90,183	\$36,145	\$126,329
8 County Region	\$5,001,060	\$2,001,049	\$7,002,110
Indiana	\$5,377,484	\$2,151,666	\$7,529,150

## Tax Revenues Impact

And, finally, state and local tax revenues declined by almost \$1.7 million since 1995 as a result of lost employment and related wages. Yearly values are below.

NSWC Crane Net Loss in Employment: Impact on Tax Revenues	
Year or Location	Local/Statewide Tax Revenues
1995	\$1,064,335
1996	\$313,563
1997	\$490,319

NSWC Crane Net Loss in Employment: Impact on Tax Revenues	
Year or Location	Local/Statewide Tax Revenues
1998	\$(227,961)
1999	\$28,095
8 County Region	\$1,551,567
Indiana	\$1,668,351

## Projected Impact of Expansion

Within the next few years, NSWC Crane will likely be faced with another round of Base Realignment and Closure or BRAC. Almost every military facility in the country will be considered for closure or possible realignment of the functions of its employees. Consequently, NSWC Crane could be in a position to see a resulting increase or decrease in its workload.

This scenario considers a possible expansion at the base. Such an expansion could result from a new project being assigned to Crane, or from redistribution of work in the next BRAC round. The following projections show what the total impact would be if increased workload created 198 new jobs at Crane.

## Employment Impact

In addition to the 198 new jobs at the base, 124 indirect and induced jobs would result, for a total of 322 new jobs. The county, region, “other” and statewide breakdowns are below.

NSWC Crane Projected Gain in Employment: Impact on Employment			
County or Location	Direct	Indirect/Induced Employment	Total
Daviess County	27	17	44
Dubois County	4	2	6
Greene County	41	26	67
Knox County	3	2	5
Lawrence County	40	25	65
Martin County	25	16	41
Monroe County	41	26	67
Orange County	3	2	5
8 County Region	184	116	300
Other Indiana	14	8	22

NSWC Crane Projected Gain in Employment: Impact on Employment			
County or Location	Direct	Indirect/Induced Employment	Total
State Total	198	124	322

## Employee Compensation Impact

Employee compensation impacts would be \$2,624,899 with an estimated \$1,726,968 related to direct jobs and \$897,930 related to indirect and induced jobs. The county, region, “other” and statewide breakdowns are below.

NSWC Crane Projected Gain in Employment: Impact on Employee Compensation (Wages)			
County or Location	Direct	Indirect/Induced Employee Compensation	Total
Daviess County	\$219,128	\$113,935	\$333,063
Dubois County	\$29,289	\$15,229	\$44,518
Greene County	\$337,791	\$175,633	\$513,425
Knox County	\$24,766	\$12,877	\$37,644
Lawrence County	\$327,562	\$170,315	\$497,876
Martin County	\$205,884	\$107,048	\$312,932
Monroe County	\$339,407	\$176,473	\$515,880
Orange County	\$24,013	\$12,485	\$36,498
8 County Region	\$1,507,840	\$783,995	\$2,291,836
Other Indiana	\$219,128	\$113,935	\$333,063
State Total	\$1,726,968	\$897,930	\$2,624,899

## Tax Revenues Impact

Total local/statewide tax revenues derived from NSWC Crane are an estimated \$542,095. The county, region, “other” and statewide breakdowns are below.

NSWC Crane Projected Gain in Employment: Impact on Tax Revenues	
County or Location	Local/Statewide Tax Revenues
Daviess County	\$73,598
Dubois County	\$9,837

NSWC Crane Projected Gain in Employment: Impact on Tax Revenues	
County or Location	Local/Statewide Tax Revenues
Greene County	\$113,453
Knox County	\$8,318
Lawrence County	\$110,018
Martin County	\$69,150
Monroe County	\$113,996
Orange County	\$8,065
8 County Region	\$506,435
Other Indiana	\$35,660
State Total	\$542,095



## Education Impact

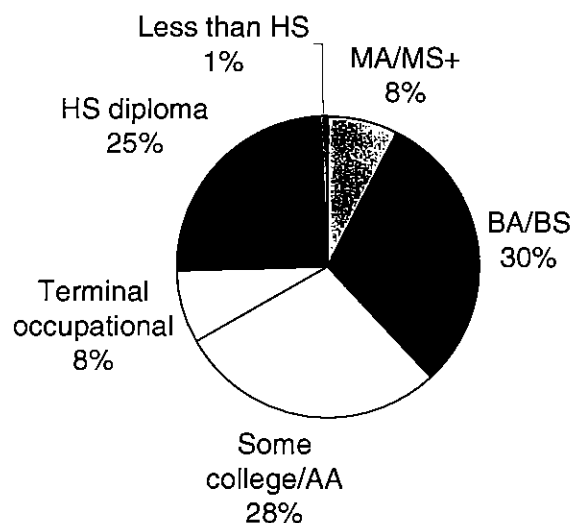
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In the primarily rural counties most heavily impacted by NSWC Crane, the base has a significant positive impact on education. It employs residents in a range of skilled jobs, counteracting the state's "brain drain" problem by attracting and retaining educated workers. Workforce training dollars for Crane employees exceed \$4.7 million annually. Crane contributes about \$600,000 to Indiana colleges and universities. The base attracts federal aid to local schools, and its employees participate in a range of programs that enrich the education of the region's young people.

### Education Levels at NSWC Crane

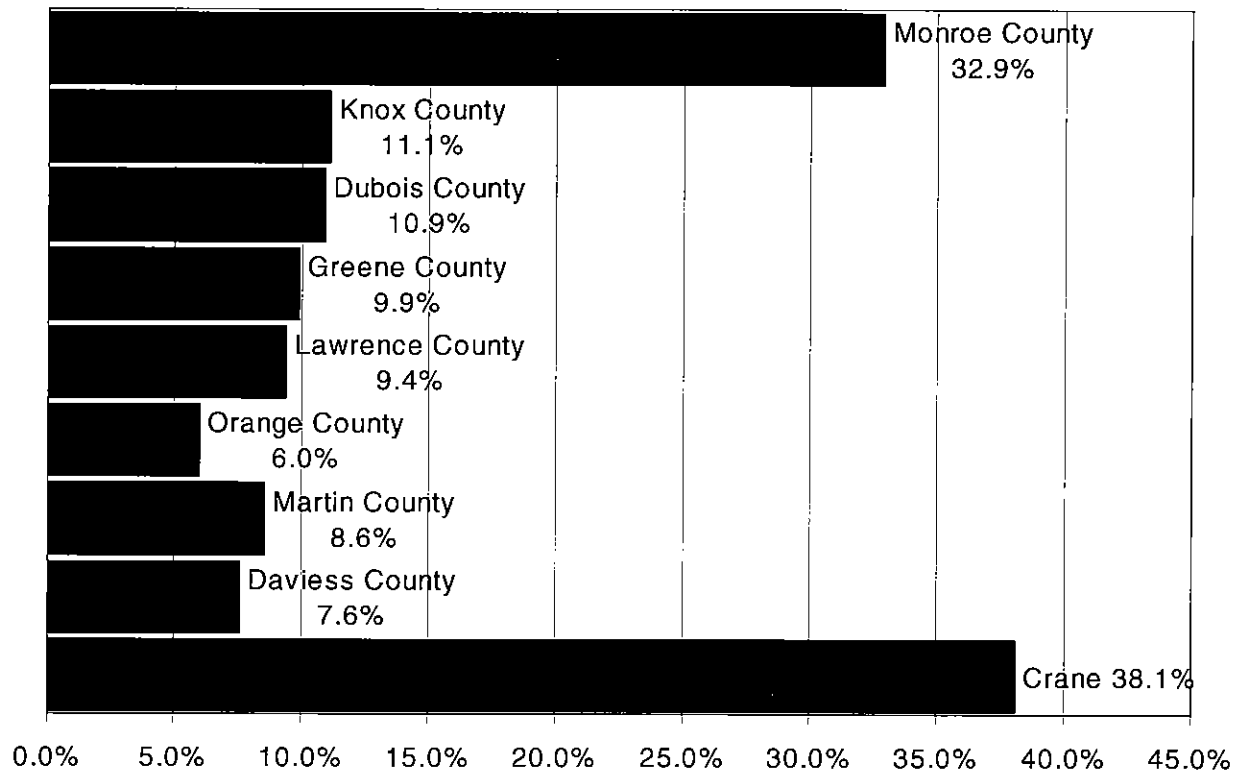
Crane injects high levels of education into a rural community that otherwise might suffer from a lack of educated workers. The average educational attainment of Crane employees is over 14 years of schooling.

**Educational Attainment of  
NSWC Crane Employees**



Approximately 22% of employees have a high school diploma or equivalent as their highest attainment. More than 11% of NSWC Crane employees have obtained as their highest degree an associate's degree. Over 27% of Crane's workforce finished with a bachelor's degree. And over 7% have earned a master's degree or higher.

#### Percentage of Adults Obtaining a BA or Higher

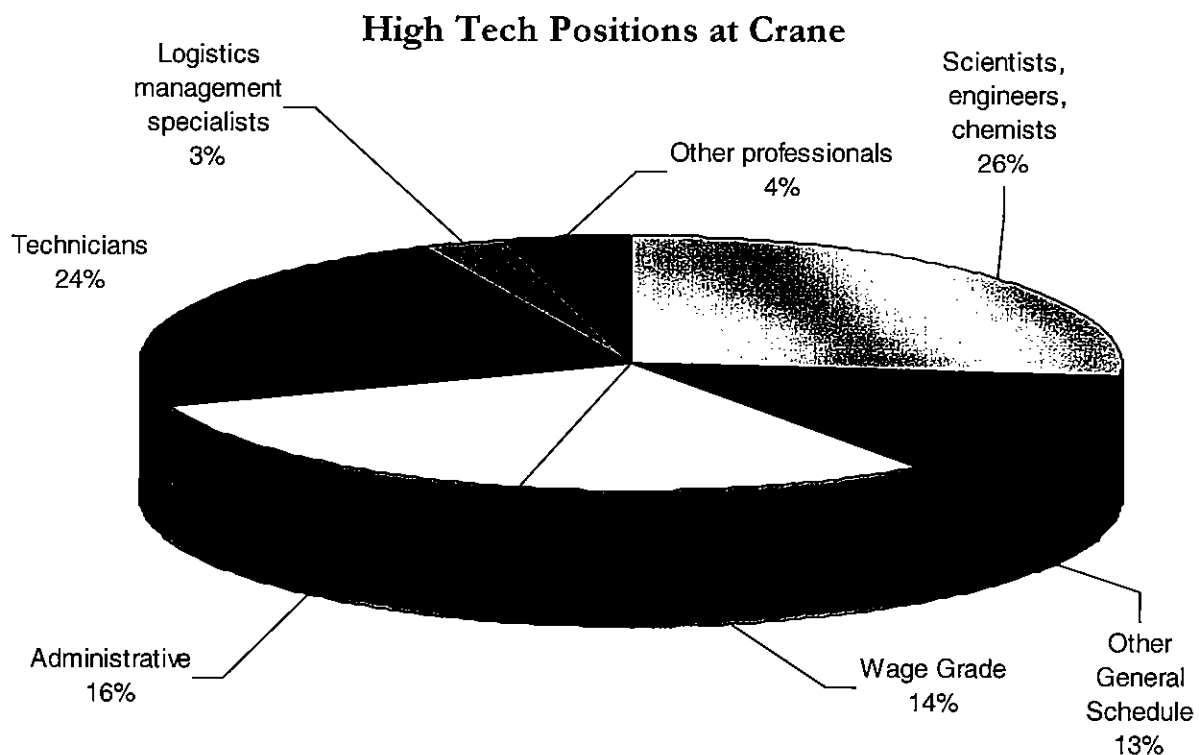


By comparison, as of the 1990 census, 33.8% of adults in Daviess County, 35.6% of those in Martin County, and 35.1% of those in Orange County had not completed even a high school education. Whereas 38.1% of Crane employees have obtained a bachelor's degree or higher, only 7.6% of adults in Daviess County had completed a bachelor's degree or higher. For Martin County that figure is 8.6%, and for Orange County, 6%. Lawrence, Greene, Dubois, and Knox counties are not much better off; the percentage of adults completing at least a four-year degree is 9.4%, 9.9%, 10.9%, and 11.1%, respectively, in those counties. Crane employees who reside in these counties are reflected in these figures; imagine how much lower the numbers

would be if Crane were not located in the region. Crane's high educational profile is especially important given the otherwise low educational levels of these counties.

## Recruitment of an Educated and Diverse Workforce

The "brain drain" of educated and technically skilled professionals has been a sharp concern at both the regional and state levels. One of the key determinants in generating and retaining highly trained scientists and engineers is the existence of a critical mass or cluster of highly trained scientists and engineers. Crane provides that critical mass.



As of July 1999, there were 41 scientists employed at Crane, 877 engineers, and 152 other professionals. In addition, Crane provides a source of diversity among these educated workers. Nearly one hundred of these educated employees are female, 14 are African American, 5 are Native American, and 49 are Asian. Thus, Crane provides an element of diverse educated people in a region that otherwise would be less educated and more homogeneous. Its 3,100 current employees work in over 170 diverse job occupations.

Because of its aging workforce, Crane will hire approximately 1,700 workers through Fiscal Year 2011(if the workload remains at its current level). Future workforce projections call for increased emphasis on hiring technicians, scientists, engineers, and a small number of administrative personnel. Hires in other job categories will occur as a result of attrition; in other words, most will be replacements.

In Fiscal Year 1998, Crane began an intensive scientific and engineering recruiting campaign. The number of employees with a bachelor's degree increased by 100 from 1997 to August 2000. Three PhDs were also hired during that period. Current plans are to hire an additional 60 scientists and engineers in Fiscal Year 2001.

## **Investment in Employee Education**

NSWC Crane recruits workers who are, on average, more educated than residents of the 8-county region in which the base is located. Its ability to recruit technicians, not just engineers, sets it apart from most employers.

Additionally, the base promotes continued education for its employees. Concurrent with external hiring, Crane has master's level programs with Rose-Hulman, Purdue University, IUPUI, and Ball State. They have also developed a formal electronics training program with Vincennes University (24-27 semester hours of course work).

The School of Public and Environmental Affairs (SPEA) of Indiana University offers a number of courses and programs at Crane. The Masters in Public Administration (MPA) Program targets supervisors and potential leaders and includes around 25 students per year. Students earn a Masters of Public Administration (MPA) degree. The Public Management Certificate (PMC) Program provides an opportunity to pursue 15 graduate credits culminating in a Certificate in Public Management. This program also targets supervisors and potential leaders and includes around 25 students per year. Students can also continue by earning a Masters of Public Administration (MPA) degree. Special seminars in selected topics and selected undergraduate programs are also offered.

Engineers are encouraged to earn an MS degree through Rose-Hulman University or Ball State University. Rose-Hulman offers graduate programs at Crane leading to an MS in engineering and engineering management. Purdue University offers courses in graduate engineering through the Indiana Higher Education Telecommunication Systems along with special seminars on selected topics. An MBA can be earned from Ball State University through the Indiana Higher Education Telecommunication System. Undergraduate programs are offered by Vincennes University, Ivy Tech and Indiana University Southeast.

Virtually every employee at Crane receives training of one type or another every year. A wide range of classes are offered on base, including computer classes, internet training, pre-retirement planning, and a wide range of technical classes, such as radar principles, configuration management, technical drawing, team building, presentation skills and relationship management. Another source of training is Crane's four-year apprenticeship program, which culminates in a journeyperson examination to test proficiency in the trade. This program will include classroom training in the respective craft. In addition, the apprentice will work under the guidance of a journeyperson in the respective craft. Crane is in the process of reestablishing apprentice programs for electrical work, pipefitting, and maintenance mechanics.

In 1997 this training amounted to an investment in intellectual human capital of \$1,043,800 for engineering and science, \$650,000 for supervision and management, \$915,000 for technical skills, \$1,078,400 for administrative skills, \$233,400 for trades and crafts, and \$844,000 for other training, amounting to a total of \$4,765,300.

## **Support to Indiana Colleges and Universities**

Not only does Crane attract educated workers to rural Indiana, it recruits those workers from within the state. By recruiting graduates of Purdue University, Indiana University, and other state schools, Crane strengthens the effectiveness of our state schools in serving Indiana for the long term.

Crane also contributes to higher education in Indiana through its direct support for employees' continued education. During Fiscal Year 2000, the base spent

approximately \$596,000 for education at Indiana institutions of higher education, including: Ball State, Indiana State, Purdue University, Rose-Hulman Institute of Technology, Indiana University Purdue University - Indianapolis, Butler University, Ivy Tech State College, Oakland City College/Bedford College Center, St. Mary of the Woods College, and Vincennes University.

Crane shares other resources with institutions of higher education. The base offers a co-op program that typically lasts two years. In 1999 this involved 24 students working on projects at Crane. Crane also provides a protected environment for undertaking research of animals and nature in an undisturbed habitat. Both Indiana University and Purdue University have undertaken a number of significant research projects focusing on newts, birds, deer, turkey vultures, and barn swallows. There is a written agreement with Purdue that long-term research on deer can be undertaken at Crane.

## **Support for K-12 Education in the Region**

The employees of Crane make a significant contribution to the educational levels of the region in many ways, including serving on local school boards. Not only are the educational levels of Crane employees high, but their spouses also tend to be highly educated. This has provided a great supply of high quality teachers to local schools. The high motivational and achievement levels of children in these families have a positive influence on their peers in these communities. In addition, Crane provides a financial subsidy to local schools, compensating for children of military and civilian employees.

Crane has donated a large number of (used) computers and scientific equipment to local schools. In addition, annual scholarships to the children of employees are provided. This typically includes seven or eight scholarships of \$1,000 a year.

Crane is a member of the following educational organizations:

- Community Alliance for Lifelong Learning (Bloomington)
- Region 10 Tech Prep Consortium

- Bedford Chamber Education Committee
- Southwest School-to-Work Committee
- Eastern Schools Partners in Education Committee

Crane's most structured contributions to local K-12 education probably come through its School Partnership Program. The program is designed to encourage the teaching of science and mathematics in Southern Indiana schools. With one of the largest concentrations of scientists, engineers, and technicians in the state, Crane is a unique resource for these schools.

In the classroom, the teacher's course outline can be supplemented and supported by in-class presentations and demonstrations by Crane personnel. During tours of Crane, students and teachers alike are afforded an opportunity to see state-of-the-art laboratories and equipment, and learn firsthand how training in math and the sciences is put to use in the defense of their country. The goal is to motivate students to actively pursue the study of math and science by demonstrating how rewarding and satisfying careers in these fields can be. The annual Science and Engineering Fair provides students with hands-on experience in these fields. Crane's School Partnership Program also offers tutoring for those students who can benefit from individual assistance or small group instruction, and career counseling for students who wish to learn more about the training required for jobs in these career fields.

Now in its seventeenth year, Crane Division's School Partnership Program has grown to include nearly 50 Southern Indiana schools. Participation by students and teachers has expanded dramatically in all aspects of the program. Such efforts are approved and encouraged by all levels of command in the Navy and the Department of Defense. Crane was among the first divisions to initiate such a program.

Crane's School Partnership Program reflects its commitment to maintaining a mutually supportive relationship with the surrounding community. It will help to ensure a bright future for southern Indiana and America's continued world leadership in technology.

In 1999, Crane was involved in the following activities through its School Partnership Program:

- Crane Science Fair, involving 25 schools and 250 students
- School Science Fairs, involving three schools and 500 students
- Center Tours, involving 30 schools and 950 students
- Tutoring, involving 10 schools and 300 students
- Career days, involving five schools and 600 students
- Work/study activities, involving two schools and 10 students
- Class presentations, involving eight schools and 250 students

In addition, Crane Employee Organizations awarded \$9,550 in scholarships and \$2,850 in Science Fair Awards.



# Community Outreach

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NSWC Crane and its employees offer many resources to the region. Contributions to area communities are made through volunteerism and charity, use of Crane facilities, community safety and infrastructure partnerships, and active participation in local and regional economic development efforts.

## Volunteerism and Charity

An important contribution made by Crane is through the high levels of volunteerism provided by its employees. Employees play a particularly important role in volunteering for organizations such as the Boy Scouts and Girl Scouts. In addition, Crane employees provide school tutoring and serve in various community and professional organizations.

During recent flooding, Crane employees helped sandbag the Wabash river to protect nearby communities. Crane employees also provide a significant amount of blood donations. They give an average of 1,407 pints of blood annually to the American Red Cross of Lawrence and Orange County.

Six years ago the NSWC Crane Fire Department decided to embark on a once a year commitment with the United States Marine Corps Reserves to collect toys for the Toys For Tots Program. Utilizing the only source of revenue at its disposal, the Fire Department solicited help from NSWC CRANE/CAAA and other Tenant Commands and contractor personnel at this military facility to help. The figures continue to show the overwhelming support these folks give to their community and their commitment to make sure that needy families in the surrounding region have joyful holidays. Crane has participated in the program each year since 1995, collecting a total of 6,441 toys between 1995 and 1999. The toys range from match box cars and small dolls to bicycles and very expensive dolls. They are distributed to poor children in Daviess, Martin, Greene and Lawrence counties.

Crane employees have also given money to support well-being in the region. Since 1971, the Combined Federal Campaign has been the uniform fundraising method for

the federal service. The 1999 Combined Federal Campaign currently consists of 387 regional campaigns and the 1998 campaign receipts (government-wide) were \$206.4 million. The organizations participating in the Combined Federal Campaign provide services, benefits or assistance to, or conduct activities affecting, human health and welfare to residents of Crane and the surrounding counties. United Ways are typical recipients and distributors of the funds raised. In 1999, \$106,527 was donated by employees at Crane.

Crane employees also contribute to the nearby communities through the many professional organizations in which they participate. Organizations include:

- Navy League Council 216
- American Society of Naval Engineers
- Society of Logistics Engineers
- Federal Managers' Association
- Indiana Society of Professional Engineers
- Crane Bass Club
- American Defense Preparedness Association
- Blacks in Government
- Chief Petty Officer Association
- Crane Golf Association
- Crane Women's Club
- Military Wives Club
- Fraternal Order of Police #158
- American Federation of Government Employees, #1415
- Lake Greenwood Toastmasters 1521
- NSWC Crane Toastmasters #2339
- Federally Employed Women (Hoosier Hills Chapter)
- Crane's Millennium Hires
- International Society of Logistics (Southern Indiana Chapter)

These are private organizations that provide support to Crane member training and through donations in support of miscellaneous activities at Crane. For example, some of Crane's organizations award scholarships to members of the workforce for continuing education. This year Crane awarded in excess of \$19,000 in scholarships to high school graduates and Crane employees continuing their education.

Crane supports these organizations by allowing them to hold meetings on base, use email and guard mail to get information to their members, and use infrastructure for the organizations' activities. These partnerships have proven to be very valuable, not only to Crane as an organization and to the members of the various organizations at Crane, but also to the surrounding communities these groups often serve.

The volunteerism and charity of employees, individually and in professional and other organizations operating at Crane, is evident. Additionally, Crane representatives serve in a variety of community organizations, linking community groups to the resources that Crane has to offer, including professional expertise as well as tangible resources. Groups so served include: Oakland City College, University of Bedford Advisory Board, Eastern Schools Partners In Education Committee, Monroe County Education Roundtable Steering Committee, Southern Indiana Mayors' Roundtable, Boy Scouts of America, Girl Scouts of America, and Greene County Solid Waste Management District. Other organizations to which Crane contributes are mentioned elsewhere in this report.

## **Use of Crane Facilities**

In a typical year, Crane hosts around 50,000 visitors. Many of these visitors are drawn by the community recreational programs Crane offers. Thousands take advantage of a public bike ride through the grounds held once a year. In addition there are several races held on the Crane grounds, including a run on the Lake Greenwood Nature Trail. These runs include a 5K run and a half marathon. Schools are allowed to use the Crane track and field as well as the football field. Crane supports Boy, Girl and Cub Scouts with a dedicated Campground. The trail around

the lake is generally open to the public, as is the 18-hole golf course. Facilities are available at the gym for weight lifting, tanning, bowling, basketball, racquetball, and tennis. During Christmas break and summer months, day care is available. Crane has a historic district, as well as ten cultural sites. Along with the natural beauty and clean air at Crane, this raises the value of real estate in the area. Crane receives input from community leaders through the Crane Division Board of Visitors.

## **Safety and Infrastructure Partnerships**

Crane provides direct financial support for the maintenance of local roads. It also provides the sewage treatment for Crane Village. (It used to provide water as well.) Revenues from logging and timber sales are shared with the appropriate county, thus contributing to the maintenance of local infrastructure.

Crane has also provided a number of security assets to local communities. Night vision equipment has been loaned to local police forces. Dogs have been trained for local police. Crane security forces have assisted in drug searches and searches for missing persons.

Crane has signed Mutual Aid Agreements with the surrounding fire departments, and the two new fire stations at Crane support the local firemen. In addition, Crane makes its training school for firefighters available to local firefighters. Weekend training is provided to 16 local firefighters. A special feature of these programs is a rescue site where rescues can be simulated.

This Fire Academy was started in March of 2000 for the purpose of obtaining National Firefighter Certification through the International Fire Service Accreditation Congress (IFSAC). Both the Department of Defense and the State of Indiana along with several other states across the United States have established this criteria as a requirement for firefighters to obtain promotion. The Fire Academy reflects a joint effort between the Commanding Officer of NSWC Crane, the Indiana State Fire Marshal and the Indiana Fire Instructors Association. This Fire Academy has to date trained more than 100 firefighters to the levels of Fire Inspectors, Fire Instructors and Fire Officer Ranks. It continues to grow as more and more Fire

Departments across the world learn of its existence. Firefighters have come from as far away as Guam, Japan, Italy, the Bahamas, and Puerto Rico. In North America, they have come from Texas, Tennessee, Georgia, Florida, Mississippi, Kentucky, North Carolina, California, Ohio, Florida, and Pennsylvania. Within the State of Indiana, attendees have come from the cities of Indianapolis, Washington, Floyd Knobs, Bedford, Clarksville, Crawfordsville, Greencastle, Evansville, Ft. Wayne, and Vincennes.

Another way Crane contributes to safety in the region and state is through the Explosive Ordnance Detachment (EOD). Facets of the EOD's service are illustrated with figures based on the period from October 1999 through August 2000:

- The EOD responds to explosives threats off of NSWC Crane. A total of 28 off-center responses, 13 ordnance-related, were completed. Forty-five ordnance items and 50 detonators were picked up and disposed of. Two Improvised Explosive Devices (IED) were taken care of and one suspect vehicle was searched.
- The EOD supports local schools. One hundred and sixty school officials in four K-12 schools were trained on Bomb Threat Procedures and Emergency Action Plans. The EOD participated in a career day and helped at a day camp.
- The EOD participates in information exchange with local law enforcement. Three information exchanges were conducted with local law enforcement agencies. The EOD gives training on identification of military munitions, explains the military munitions rule and briefs police officers on the make up of the IED's encountered.
- The EOD participates in Post Blast Seminars. The EOD participated in two Post Blast Seminars, one hosted by the ATF and one hosted by the FBI. EOD covered military munitions identification and the military munitions rule and IEDs encountered. These seminars are attended by bomb technicians of the local law enforcement.

- The EOD shares its expertise through other training venues. For example, the EOD conducted a demolition training with the Indianapolis Bomb Squad.

## **Economic Development**

To promote economic development in neighboring communities, Crane is a member of the following organizations:

- Indiana Business Modernization & Technology Corporation
- Crane Regional Economic Development Organization
- Indiana Manufacturers Association
- Crane Technology Transfer Industrial Outreach Program
- Indiana Economic Development Council
- Southern Indiana Development Commission
- Southwestern Indiana Development Council
- Bedford Economic Development Committee
- Daviess County Economic Development Committee
- Greene County Economic Development Committee

In addition, Crane is a member of the Chambers of Commerce for the state of Indiana, the counties of Daviess, Martin, Pike, and Sullivan and the Cities of Bedford, Bloomington, Bloomfield, French Lick/West Baden, Linton, and Mitchell.

Local elected officials understand the importance of Crane to economic well-being and development in their communities. John Fernandez, mayor of Bloomington, states that "Although Bloomington's economy is diversified, the importance of Crane can not be underestimated. NSWC Crane employs hundreds of Bloomington residents. In addition, the base serves as the major focal point for our regional economic development strategy." The mayor of Bedford, John Williams, similarly emphasizes that "NSWC Crane is the most important employer for the entire South Central Indiana region. It makes a significant economic impact upon communities as diverse as Bloomfield, Bloomington and Bedford. Crane also provides a

tremendous educational and social resource for this entire area. Crane has been an employer we have counted on to help our economy."

Crane also supports the local economy by buying from local businesses. It participates in the Buy Indiana initiative. In Fiscal Year 1999, it gave over \$56 million to Indiana companies, representing about 15% of all dollars procured by Crane. As of June 2000, over \$450,000 had been awarded in Daviess, Greene, Knox, Lawrence, Martin, Monroe, and Orange counties.

Crane also supports small businesses, minority-owned businesses and businesses owned by persons with disabilities. In Fiscal Year 1999, about 43% of total dollars, or \$346 million, went to small businesses, and about 4% of those dollars went to minority-owned businesses.

# Environmental Leadership

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Crane has been a leader in environmental stewardship. Some of its contributions are described in the areas of natural resources management and research, hunting and fishing, outdoor recreation, green practices, and wildlife preservation and research.

## Natural Resources Management and Research

Crane cooperates with the Martin County Soil and Water Conservation District to manage two major floodwater-retarding structures, which are located at NSWC Crane. These structures provide protection for farmland located downstream from Crane.

Universities have long recognized Crane as an almost ideal environment for conducting research in the natural resources field. The diverse natural environment has enticed both Purdue University and Indiana University to utilize Crane for natural resources research.

One of Crane's greatest natural resources is its forest. Approximately 48,583 acres of the base's terrain are classified as Central Hardwoods Forest. Commercial trees include black walnut, red and white oak, sugar maple, yellow poplar, white ash, hickory and sycamore. When the navy obtained title to the land, approximately one-half of the forested area was over-cut, burned, pastured, contained undesirable species or had little growing stock. This depleted land has been restored and is now supporting a young and healthy forest.

Under the National Resources Program, Crane shares the revenues accruing from the natural resources with the neighboring counties. The value of the timber on Crane's 48,583 acres of timberland is estimated to be \$130 million. An estimated 2,802,197 board foot of hardwood saw timber have been harvested during the last three years, for an annual revenue of around \$1 million. Forest products are sold by sealed bid and returned \$2,772,641 to the government. The timber removed during



annual sales never exceeds 21 percent of the annual growth as calculated in the management plan. Profits from the sale of timber products are shared with local government and in the last three years more than \$560,101 was set aside for Martin, Greene and Lawrence Counties. Martin County, which has the largest portion, received nearly \$200,000 last year.

## **Hunting and Fishing**

Approximately 54,000 acres of land are available for hunting and 900 acres of water in lakes and streams and ponds are open for fishing.

The annual deer hunt draws hunters throughout the State of Indiana and is a good example of the effort that is made to impartially extend the use of Crane's natural resources to all interested citizens. Hunters for the deer hunt are selected in a drawing conducted by the Indiana Department of Natural Resources. In the last three years there have been 18 days of public deer hunting with more than 7,669 hunters harvesting 1,317 deer. Estimated expenditures of these hunters equal approximately \$272,000 per year.

In cooperation with the Indiana Deer Hunters Association and the Indiana Department of Natural Resources, Crane sponsors an annual one-day deer hunt for holders of the Indiana Handicapped Hunting Permit. The event has grown to attract 120 hunters annually. The day of hunting for the handicapped hunters has proven to be enjoyable for both the hunters and volunteer helpers.

Fishing is very popular on the 820-acre Lake Greenwood and again Crane has been able to make this valuable resource available to the public. Annual permits are sold for \$15.00 with about 1,799 permits being sold each year. Daily permits for \$2.00 are also available. Both the Crane Bass Club and Recreation Department sponsor fishing tournaments on Lake Greenwood. Membership to the Crane Bass Club is open to all citizens.

The sales from hunting and fishing permits are used to underwrite the Wildlife Management Program, which operates on an annual budget of about \$50,000.

## **Outdoor Recreation**

Other recreational opportunities are made available to the public. A hiking trail of almost 17 miles has been constructed by high school volunteers from the Student Conservation Association (SCA). Crane has used the services of the SCA for the last six years. The SCA provides a means to accomplish labor-intensive conservation work and at the same time provides a wonderful opportunity for the young volunteers to learn more about the environment.

Crane is well known as one of the best bike riding areas in Indiana. Its ability to close roads to motorized vehicle traffic eliminates traffic safety concerns during scheduled events. The wooded and hilly terrain of the area provides the bikers a scenic and challenging ride. The annual Crane-sponsored bike ride had over 2,000 participants over the last three years. Permission is granted to several bike clubs each year to hold bike rides at Crane.

Other outdoor recreational events included the Crane-sponsored run, horseback rides, railroad motorcar rides, fishing tournaments, and picnics. All of these events are open to the general public. The fall foliage tour which Crane sponsors draws more than 1,000 people annually.

## **Green Practices**

The recycling program covers the entire 62,463-acre facility, including the Navy and tenant activities at Crane. In Fiscal Year 1999, the facility recycled and sold 34,211,793 pounds of metals, generating \$3,760,704. With community interest and Crane personnel involvement, the recycling program has grown to include transparencies, batteries, toner cartridges, wood, Styrofoam, plastic, and various automotive parts. In Fiscal Year 1999, the facility also recycled and sold 397,947 pounds of wood, generating \$12,300. Valuable landfill space was saved by the reutilization of 802,053 pounds. The recycling of 74,500 pounds of batteries

generated \$3,177 in proceeds, and resulted in a cost avoidance of \$72,265. All of these materials are collected, transported, handled, documented, and disposed of in a manner that maximizes reuse, recovery, and recycling. In addition to recycling its materials, Crane makes an effort to buy recycled products. Many recycled materials were purchased and used at Crane in the last year, including 100 tons of paper and 1155 gallons of re-refined oils.

Crane has been involved with community activities and local environmental organizations for several years. The base routinely cooperates with Federal, State and local agencies, organizations, and academic institutions. Crane is a member of "Partners for Pollution Prevention," which involves state, private and federal facilities in researching alternatives to hazardous material usage, recycling, providing information to other companies, and hosting a Pollution Prevention Conference. Crane is a member of a DOD Tri-State P2 Team, which focuses on recycling and P2. The facility also partners with the Martin County Solid Waste Management District, which includes 10,381 residents. Crane is an active member of the Indiana Recycling Coalition and the Southern Indiana Recycling Coalition.

## **Wildlife Preservation and Research**

A partnership with the state has resulted in the preservation and even re-introduction of wildlife that had previously disappeared. Public Law 86-797, under the Sikes Act, provided for a Cooperative Agreement to preserve the wildlife at Crane. The Cooperative Agreement involves the U.S. Fish and Wildlife Division, the Indiana Department of Natural Resources and NSWC Crane. The Rough Grouse, Wild Turkey, Great Blue Heron, Bald Eagle, and Indiana Bat have all been successfully reintroduced at Crane. In 1999, Congress passed the Hawk Program to preserve hawks. Crane has participated in this program. Crane is a member of the Sierra Club and has a strong commitment to nature conservation. It has also participated in Handicapped Americans for Wildlife.

The largest forest block in Indiana is found at Crane. As previously mentioned, Crane enables research of animals and nature to be undertaken in the undisturbed

habitat found at the base. Both Indiana University and Purdue have conducted a number of significant research projects focusing on newts, birds, deer, turkey vultures, and barn swallows. Crane has never turned away an interested and qualified researcher wishing to study some aspect of nature on its land.

# Technology Impact

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Many resources related to Crane support economic development via the transfer of technology. Strengthening this process has the potential to significantly impact the economy of the region and the state.

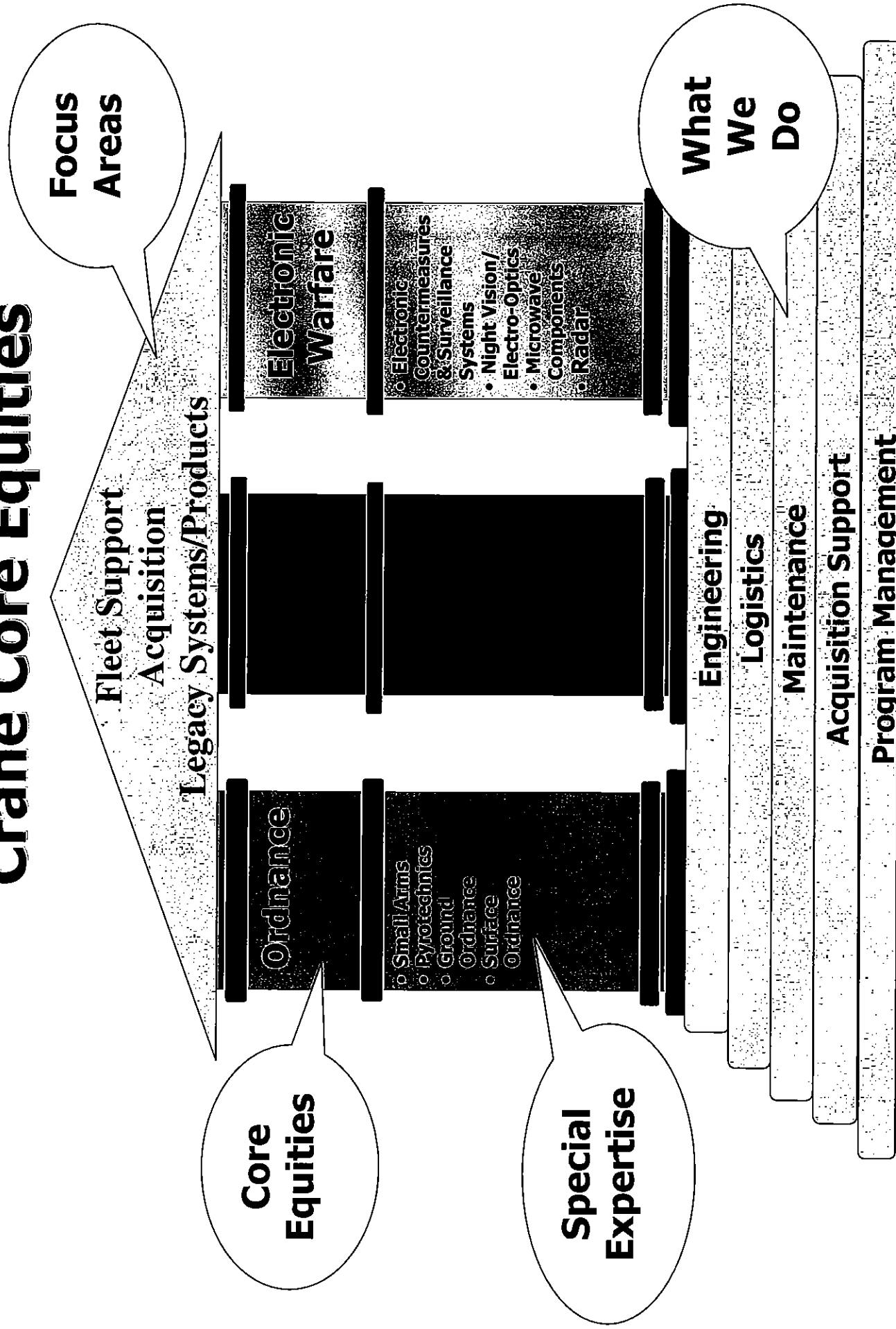
## Current Technology Impact

Crane has generated substantial benefits to both the region as well as the state in the form of technology assistance that is transferred out of the engineering laboratories to private firms. As depicted on the following page, Crane has demonstrated excellence in the areas of microelectronic technology, electronic circuit card production, test & repair, microwave components, acoustic sensors, security systems, small arms, conventional ammunition engineering, pyrotechnics, electrochemical and related technology power systems, radar systems, electro-optics, night vision, and chemical and biodetection systems. In addition, Crane has state-of-the art design, development and production engineering capabilities for a high spectrum of electronic systems.

To facilitate and promote technology transfer, in 1995 Crane established a Technology Transfer Office, which serves as a conduit between the engineering done at Crane and the private sector. The Technology Transfer Office enables contractors to access technology developed at Crane to improve their operations. In addition, the Office works with Economic Development Organizations in all of the various communities in the region. The Technology Transfer Program (T<sup>2</sup>) has generated substantial benefits to both the region as well as the state by enabling business and academia to utilize Crane's enormous capabilities and facilities. Three T<sup>2</sup> programs in particular have provided major benefits to area and state businesses: the 32-hour Pro Bono Program, the Sale of Testing Services, and Cooperative Research and Development Agreements (CRADAs).

Under the 32-hour program, a company experiencing difficulties in production or manufacturing can come to Crane and receive up to 32 hours of support to solve the

# Crane Core Equities



problem. The project saved one Southern Indiana company \$350,000 by solving their manufacturing and processing problem in less than 20 hours. It enabled another company to avoid shutting down a manufacturing line for an extended period by remedying their dilemma in less than four hours. Over 250 Indiana companies have used the program to date, resulting in substantial cost savings and process and product improvement.

The Sale of Test Services (2539b) agreement gives state businesses access to Crane's testing facilities, which include material science, failure analysis, shock and environmental impact, vibration, and acoustic sensor testing. The service draws on Crane's expertise in a range of areas, as mentioned above. Since the inception of the 2539b program in the fall of 1998, more than 84 companies have contacted Crane for testing services. All have been satisfied with the results.

Numerous Indiana companies and organizations have utilized the Cooperative Research and Development Agreements (CRADA) program to team with Crane in the transfer and development of dual-use technologies. These include Cinergy, IPC, Battery Evaluation and Test Center (BETC), AdvanceTek, EG&G, Mid America Plastic Partners (MAPP), Davince Tek, and Technology Service Corporation. Over 28 CRADAs have been established with private industry and academia. The T<sup>2</sup> Program is a primary point of contact for industrial clients interested in partnering and teaming with Crane.

The T<sup>2</sup> Program developed a program that enables Crane to loan Night Vision Goggles to state and local law enforcement agencies. This program has greatly improved the law enforcement communities' ability to perform their duties and has received favorable recognition from numerous federal agencies.

The T<sup>2</sup> Program is Crane's economic development liaison with state and local economic development directors. It focuses efforts on beneficial business endeavors. The Program represents Crane on industrial, academic and business working groups, boards and committees such as Access Technology Across Indiana (ATAIN), Dean's Industrial Advisory Council (DIAC), Indiana Manufacturers

Association (IMA), Technical Assistance and Services Center (TASC), Indiana Environmental Extension Network (IEEN), Institute for Forensic Imaging (IFF), BETC, and MAPP.

The T<sup>2</sup> Program worked to facilitate Congressional support for research and development projects with Rose Hulman, Purdue University, Cinergy and Indiana University. These efforts have amounted to over \$7.5 million in project opportunities between the partners and have included technologies that ranged from the Proton Exchange Membrane Fuel Cell to the Solid State Microwave.

The T<sup>2</sup> Program helps to develop, promote and support events that generate teaming and partnering opportunities. Each event provides an opportunity to discuss programs and capabilities available at Crane, tour labs, meet with the Crane scientists and engineers, and explore the development of a “technology triangle” in the region.

## **Potential Impact**

Clearly, local communities reap substantial qualitative benefits from Crane. While these indirect benefits are compelling by themselves, their magnitude could in fact be even greater. A number of research centers around the country have succeeded in leveraging the benefits from similar technology centers for private commercialization. Examples of such centers include: the Research Triangle in North Carolina; Austin, Texas; and Cambridge, Massachusetts

These research centers serve as an engine of technology transfer, fueling high rates of economic growth and generating high-wage job opportunities for the local population. According to Break Away Growth in Indiana, published by the Indiana Economic Development Council, high-wage job opportunities ranks among the highest priorities in the state. Both the Ames Research Facility of NASA in Silicon Valley and Sandia in New Mexico are examples of federal facilities that are strategically implementing programs to magnify their impact on the economic development of their regions via technology transfer. Given its high technological resources and strong knowledge assets in the form of scientists and engineers, Crane



also has the potential to generate even greater qualitative benefits in the form of increased technological spillovers to the private sector.

State funds could help expand the T<sup>2</sup> program to assist firms across Indiana, but the possibilities expand significantly beyond the T<sup>2</sup> program. For example, Crane's analysis capabilities could be mobilized in partnership with Rose-Hulman to support small business start-ups. (Rose is pursuing such a program with funding from the Lilly Endowment.) Another possible partnership in higher education would involve Crane and Indiana University teaming up to advance telemedicine in Indiana. Crane could also be used to increase the telecommunications capability of southern Indiana. Building on the resources Crane provides, particularly its critical mass of scientists and engineers, a high-technology corridor could be created, strengthening the state economy and providing good jobs for residents.

Studies have identified seven determinants of successful spillovers or technology transfers from a knowledge source (such as a university or research center) to the private sector. The success factors are:

1. Involvement of the Research Center in the Local/Regional Community
2. Presence of High-Tech Talent
3. Finance & Funding Opportunities
4. Physical Infrastructure
5. Entrepreneurial Culture
6. Life-Style Amenities
7. Leadership & Champion

The high-technology cluster created in Austin, Texas scores high in all dimensions. Similarly, the Research Triangle in North Carolina scores high in all dimensions, except for physical infrastructure, where it scores above average.

A program can be developed to help magnify Crane's impact on the regional and state communities via technology transfer. Each of the seven dimensions for successful technology transfer is considered in turn.

## 1. Involvement of the Research Center in the Local/Regional Community

Crane has already established a long tradition of being involved in the local community. However, this tradition has been stronger in terms of services provided to the local community, rather than technology transfer. Still, the connections and ties that have been built up over the years involving community service provide a strong foundation for extending the relationship to involving technology transfer.

To have greater involvement of Crane in the local/regional community, a technology center could be created to partner Crane, the region, and perhaps the state. This technology center might be dedicated to transferring technology developed at Crane for commercial application by private industry, and to using Crane's engineering capability to develop and improve new products and assist startup companies located at the center. The center would draw on the deep scientific and engineering traditions and experience with the Department of Defense already established at Crane.

## 2. Presence of High-Tech Talent

There is a great deal of human capital at Crane in the form of scientists and engineers. However, this is not matched by a reservoir of scientific and engineering resources outside of Crane in the neighboring communities. There is little in terms of major industrial activity in the area. This suggests that Crane employees may need to be involved in the process of technology transfer, and perhaps even in creating some of the firms commercializing that technology. In fact, the demographics of Crane employees are promising in this regard, since a large cohort will be retiring in the next few years. While some of these employees will move away to traditional retirement locations, many will choose to remain in the area, and continue to be professionally active.

An important national trend among educated retirees has been an increase in the number that start their own firms. Given their technical and managerial competence, many of Crane's retirees may wish to become entrepreneurs. This has been a pattern found among retiring military and non-military personnel around the country. Thus,

tapping the resource of retiring Crane scientists and engineers who wish to start their own firms could create an external source of technical skills and competence. These employees would provide a valuable source of technological competence for existing firms as well.

### 3. Finance & Funding Opportunities

While a large pool of potential hi-tech entrepreneurs may emerge upon retiring from Crane in the next few years, difficulties in financing technology-based new ventures have often deterred prospective entrepreneurs from actually starting a new firm. However, several new programs exist at both the federal and state levels that are designed to provide finance and funding opportunities to technology-based entrepreneurs. One of the most important policies to promote small and medium-sized enterprises (SMEs) at the federal level has been the Small Business Innovation Research (SBIR) program.

The United States Congress enacted the SBIR in 1984. The Program mandates that each participating government agency spend a share of its research budget on contracts to small firms. This includes the major federal agencies, such as the Department of Defense, the National Institutes of Health, the National Science Foundation, Department of Energy and the National Aeronautics and Space Administration. The Small Business Innovation Development Act of 1982 required that agencies with extramural research and development budgets of \$100 million or more set aside not less than 0.2 percent of that amount for the SBIR program. In addition, the Act provided for annual increases up to a ceiling of not less than 1.25 percent of the agencies' budgets. The amount of awards totaled over \$1.4 billion in 1999.

The SBIR consists of three phases. Phase I is oriented towards determining the scientific and technical merit along with the feasibility of a proposed research idea. Phase II extends the technological idea and emphasizes commercialization. Phase III involves additional private funding for the commercial application of a technology.

Under the Small Business Research and Development Enhancement Act of 1992, funding in Phase I was increased to \$100,000, and in Phase II to \$750,000.

The SBIR represents about 60 percent of all public SME finance programs. Taken together, the public SME finance is about two-thirds as large as private venture capital. In 1995, the sum of equity financing provided through and guaranteed by public programs financing SMEs was \$2.4 billion, which amounted to more than 60 percent of the total funding disbursed by traditional venture funds in that year. Equally as important, the emphasis on SBIR and most public funds is on early stage finance, which is generally ignored by private venture capital. Some of the most innovative American companies received early stage finance from SBIR, including Apple Computer, Chron, Compaq, and Intel.

Given the technological assets of the Crane workforce, combined with the experience of working for the Department of Defense and creating products for specified DOD projects, Crane employees starting their own firms should have a competitive advantage at obtaining SBIR funding.

#### 4. Physical Infrastructure

The physical infrastructure provided by Crane is a strong asset to technology transfer. Most of the infrastructure needed for new technology-based enterprises as well as established high-tech firms are available at the Crane facility. The establishment of an incubator, which would consist of a building targeted for spin-offs, might facilitate the use of the superb physical infrastructure already found at Crane. Such an incubator might be a natural extension from the partnership with Rose-Hulman which is currently being developed.

Improved infrastructure linkages, particularly in terms of transportation, between Crane and the rest of the region would no doubt amplify the spillover benefits accruing from a Crane Technology Park. The proposed I-69 interstate highway would have a multiplier effect on the spillover of technology from Crane to private users. Even more importantly, a small investment in fiber optics could create a technology corridor in Indiana. This would help create a virtual integrated

technology incubator. Such a technology corridor would greatly magnify the impact of Crane's technology on the rest of the state.

## 5. Entrepreneurial Culture

The counties neighboring Crane do not have a demonstrated record of entrepreneurial activity. No entrepreneurial culture has been developed. The SBIR Program, described above, can be used to create an entrepreneurial culture in regions where no such tradition exists. There is already evidence from Indiana suggesting that the SBIR helps foster an entrepreneurial culture by altering the career choices of scientists and engineers. In particular, the evidence suggests that:

- A significant number of the firms would not have been started in the absence of SBIR.
- A significant number of the scientists and engineers would not have become involved in the commercialization process in the absence of SBIR.
- A significant number of other firms are started because of the demonstration effect by the efforts of scientists to commercialize knowledge.
- As a result of the demonstration effect by SBIR funded commercialization, a number of other scientists alter their careers to include commercialization efforts.
- Technology-based entrepreneurs start firms because they have ideas that they think are potentially valuable; they do not start firms and then search for useful ideas or products.

The entrepreneurial climate surrounding Crane would be greatly enhanced if retiring employees start their own firms. From experiences in other communities, such a wave of entrepreneurship is likely to have a multiplier effect, and lead to other (non-Crane) employees also starting new firms. However, one of the major barriers to creating an entrepreneurial culture is that most Crane employees have spent their entire careers working in large organizations and have no entrepreneurial experience. There is a clear lack of experience and knowledge about how to start and manage a new firm. To help facilitate the movement of retiring Crane employees into entrepreneurship, Crane might partner with Indiana University to make available

courses on entrepreneurial skills, such as small business management, finance, marketing and accounting. This would contribute to creating an entrepreneurial culture around Crane and ultimately facilitate the spillovers from Crane. In addition, Indiana University would be a good source of interns to provide services for new startups, such as the design of web pages. Further, non-profit organizations could be established to place retired employees in technology-based companies. These types of programs would also help economic development organizations in the region who work to attract existing companies to locate near Crane.

#### 6. Life-Style Amenities

The quality of life contributes strongly to the high-technology clusters at the Research Triangle and Austin, Texas. Knowledge workers, such as engineers and scientists, tend to locate where life-style amenities are strong and available. Crane and the surrounding communities provide superb life-style amenities. These amenities should be leveraged to keep engineers and scientists in the area and to spur a high-tech cluster.

#### 7. Leadership & Champion

A feature common among all research centers that serve as a source for technological spillovers is the presence of a strong champion. The flow of technological knowledge from the research center of Austin, Texas to commercialization by private firms is the result of strong leadership by a visionary champion. To the extent possible, this leadership role needs to be institutionalized in the form of a champion or office charged with promoting technology transfer from Crane to the private sector.

## Action Steps

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What can leaders do to maximize spillover benefits of Crane? Educating others about the value of Crane to the regional economy and quality of life is important. Other leaders and the public also need to understand the risk of continued losses at the base, as well as the potential for leveraging Crane to build a high-technology economy that will benefit the state. Leaders in government can play an essential role in addressing the two major issues at hand: the risks of continued losses and even closure of Crane, and the economic development potential inherent in Crane's resources.

### Preventing Loss

Several steps can be taken to guard against continued workforce reductions and potential base closure:

1. Indiana leaders, including federal legislators, need to continue to learn about and build relationships with the Naval Sea System Command (Crane's parent organization), the Navy and Department of Defense leadership. This is especially important in the spring of 2001, as the new administration's political appointees are nominated and confirmed. This new Navy leadership will be instrumental in future rounds of Base Realignment and Closure (BRAC), including decisions about workload distribution and redistribution.
2. All stakeholders should participate in the development of plans to maximize workload at NSWC Crane. Strategies need to be developed and implemented for pursuing potential Department of Defense or other government workload.
3. The State of Indiana should staff a full-time coordinating position. Duties could include:
  - Continually tracking key Department of Defense personnel and activities that might affect Crane;
  - Coordinating State leaders' meetings with central Department of Defense and Navy leaders;

- Developing and implementing BRAC defense strategies and plans;
- Developing political strategies to influence placement of federal work at Crane.

## **High Technology Economic Development**

A State strategy should also be developed regarding how to use Crane as a magnet for high technology economic development in the Crane region and throughout Indiana. A series of State leadership and funding initiatives would jump start this process.

An overall plan needs to be developed that accounts for the wide variety of potential economic development possibilities through the use of Crane resources and technologies. This plan should include (but need not be limited to) the following development initiatives:

1. A State-supported partnership between Crane and Rose-Hulman that leverages the high technology development grant from Lilly to Rose.
2. A State-led telemedicine initiative that takes advantage of the telemedicine partnership between Indiana University, Crane, and the Navy.
3. State funding to augment Crane's technology transfer program to help more Indiana firms with product development and production.
4. State support to use Crane's expertise as the Navy lead in the fields of small arms, non-lethal ammunition, night vision, ordnance development production and disposal, and material and chemical analysis laboratories to assist Indiana law enforcement agencies.
5. State leadership to transfer the telemaintenance technology developed by Crane and Indiana University to State and private organizations.
6. State-funded communications (fiber-optic) infrastructure to Crane that will allow high bandwidth ties between Crane, Purdue, Indiana University and Rose-Hulman, creating a virtual technology corridor.
7. A mechanism to use Crane's available technology and resources as part of a package used to entice additional high tech firms to the State.



8. A State-coordinated collaboration of Crane, Rose-Hulman, Purdue and Indiana University to continually develop additional strategies and initiatives for high tech economic development.

A State of Indiana employee needs to be designated to lead and coordinate this State economic development process. The position could combine loss prevention and high tech leveraging duties related to Crane.

Of course there will be roles for business, local governments, and other stakeholders to play as well. But for Indiana to realize the potential inherent in Crane's tremendous resources, the State must take a leadership role in a strategic development process.

